

# Association of Anxiety and Depression with Glaucoma

Dr. Rekha Sharma<sup>1</sup>, Dr. Akhilesh Jain<sup>2</sup> Dr. Ashu Shah<sup>3</sup> and Dr. Raghav Shah<sup>4</sup>

<sup>1</sup>IMO Grade-I, ESIC Model Hospital, Jaipur (Rajasthan) India

<sup>2</sup>Head of Department (Psychiatry), ESIC. Model Hospital Jaipur(Rajasthan) India

<sup>3</sup>Senior Registrar, Department of Ophthalmology, SMS Medical College, Jaipur (Rajasthan) India

<sup>4</sup>Senior Registrar, Department of Psychiatry, SMS Medical College, Jaipur (Rajasthan) India

**Abstract**— *Glaucoma is the third largest cause of blindness worldwide after cataract and trachoma. Along with burden of blindness it also has psychological impact. So this study was designed to find out association of Insomnia, Anxiety and depression with Glaucoma. A case-series type of observational study was carried out on 100 glaucoma cases attended at ESIC Model Hospital, Jaipur (Raj). For assessment of anxiety and depression the Hospital Anxiety and Depression Scale (HADS) and for insomnia modified Diagnostic and Statistical Manual, Fourth edition (DSM-IV) criteria was used. Data collected were analysed and inferred with chi-square test. It was found in this study that Insomnia is associated with Age, Visual acuity in both the eyes and severity of glaucoma in glaucoma cases, with severity of glaucoma it was observed highly significant. Anxiety is associated with Age, Pupillary reaction, Visual acuity in both the eyes and severity of glaucoma in glaucoma cases, with age and severity of glaucoma it was observed highly significant. Depression is not associated with any of supra-said factors in glaucoma cases*

**Key words:** *Insomnia, Anxiety, Depression and Glaucoma*

## 1. Introduction

Glaucoma is a heterogeneous group of conditions involving cupping and atrophy of the optic nerve, characteristic visual field loss and often but not invariably a high intraocular pressure.<sup>1</sup> It is estimated that over 60 million people worldwide currently suffer from glaucoma, of whom 4.5 million are estimated to become legally blind<sup>2</sup>. Glaucoma is the third largest cause of blindness worldwide after cataract and trachoma. In India more than 90% of glaucoma remain undiagnosed then also studies reported that one in eight persons above the age of 40 years in India is either suffering from glaucoma or is at risk of the disease accounting for glaucoma prevalence in India between 2 to 13 %.<sup>3</sup> The role of emotional factors in glaucoma is also important and has received wide recognition by investigators and clinicians from the very beginning.<sup>4</sup> So glaucoma is also considered to be a psychosomatic disorder. Physical illnesses also create psychological sequel that precipitate psychiatric disorders severe enough to require specialist treatment.<sup>5</sup> Depression and anxiety constitute greater percentage of these common co-morbid psychiatric disorders in glaucoma patients.<sup>6</sup> Additionally it is also reported that the presence of these symptoms in patients leads to poor glaucoma medication use.<sup>7</sup> So for proper treatment of glaucoma and these psychiatric co-morbidity that develop with glaucoma, it is also important to identify associating factors of these psychiatric co-morbidity with glaucoma.

## 2. Methodology

A cross-sectional case-series type of observational study was carried out with joint venture of Department of Psychiatry and Department of Ophthalmology at ESIC Model Hospital, Jaipur. Hundred patients with glaucoma were identified by taking every eligible case from outpatient department and ward of ophthalmology during 1<sup>st</sup> Jan. 2013 to 30<sup>th</sup> June 2013. For eligibility of study participants Hindi speaking adult patients (18 -60 years) with glaucoma from more than 6 months prior to enrollment were consider for inclusion criteria. Glaucoma was diagnosed based on glaucomatous disc cupping and

reproducible visual field damage in one or both eyes. Out of these identified cases, cases with present or past history of major psychiatric illness, current use of any medication which may result psychiatric (systemic use of beta blockers), incisional eye surgery within the previous three months or laser treatment within the previous one month, disability in visual field testing due to causes other than glaucoma (e.g., cognitive impairment) and other severe vision-impaired eye diseases were excluded.

After seeking informed consent 100 eligible subjects were interrogated as proforma and scales to identified Anxiety and depression in glaucoma patient along with their socio demographic characteristics.

For anxiety and depression the Hospital Anxiety and Depression Scale (HADS)<sup>8</sup> was used which is a 14-item self-reported scale which includes 7 items that measure depression and 7 that assess anxiety. Each item is rated on a scale from 0 ("not at all") to 3 ("very much"),

All participants underwent comprehensive ophthalmic examinations and evaluated for glaucoma symptoms like pain, congestion etc. Anterior chamber depth examined by slit lamp, and visual acuity by refraction unit. Detailed fundus examination was also done and cup disc ratio was calculated. Automated static perimetry (Humphrey visual field analyzer 30-2) was used to detect peripheral visual field defects and gonioscopy was done to find status of angle (open or closed). Patients were categorized as mild, moderate and severe depending on the results of status of cup and fields.

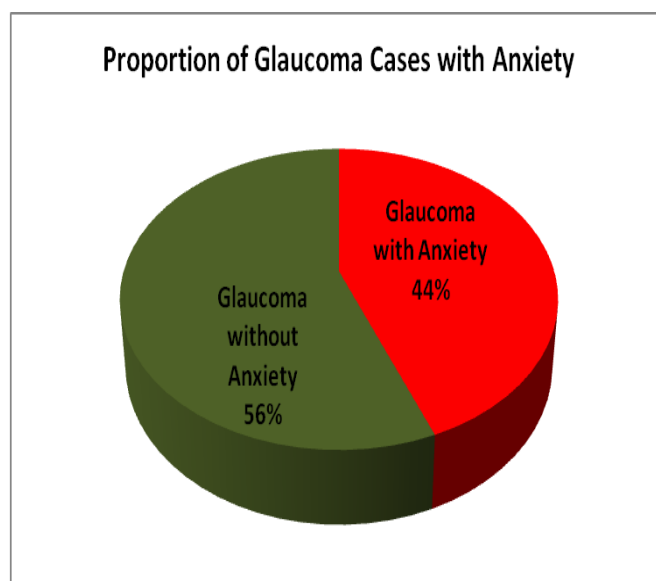
Statistical analysis:

Data thus collected were classified and analyzed as with the help of MS Excell 2007 and Primer (version 6) statistical software. To find out difference in proportion chi square test was used and for significance 'p' value 0.05 or less was considered significant.

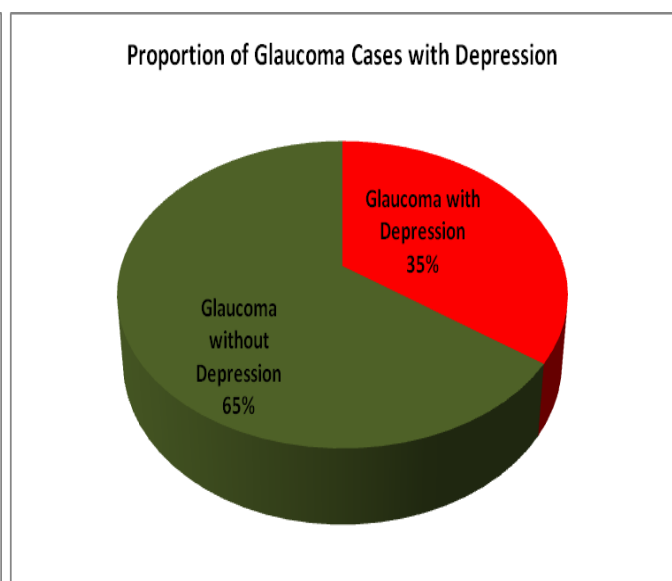
### 3. Results

In this present study it was observed that out of total 100 eligible glaucoma cases anxiety was found in 44% (Fig 1) and depression was found in 35% (Fig 2) of glaucoma cases as per Hospital Anxiety and Depression Scale (HADS).

**Fig. 1**



**Fig. 2**



It was also observed in this study that difference in proportion as per sex was not found significant ( $p > 0.05$ ) in any of two identified psychiatric co-morbidity with glaucoma i.e. anxiety and depression. (Table 1)

As far as the age wise distribution of cases is concern in this study, maximum cases (more than half of total cases i.e. 58%) of glaucoma were found in age 50-70 years of age group with mean age 55.4 years. When association of psychiatric co-morbidity with age was observed in glaucoma cases, it was found that although depression was not found to be associated ( $P=0.283$ ) but anxiety ( $P<0.001$ ) were found associated with age. Anxiety was significantly more in 50-70 years of age group. (Table 1)

Table No.1

## Association of Socio-demographic Factors with Anxiety and Depression in Glaucoma Cases

Variables		Total Glaucoma Cases (N=100)	Glaucoma Cases with	
			Anxiety (N=44)	Depression (N=35)
Sex	Male	50	18	16
	Female	50	26	19
	<b>Chi-square Test at 1DF</b> <b>P Value</b> <b>LS</b>		<b>1.989</b> <b>P=0.158</b> <b>NS</b>	<b>0.176</b> <b>P=0.675</b> <b>NS</b>
Age Group	<30	6	0	2
	30-50	29	6	7
	50-70	58	35	25
	>70	7	3	1
	<b>Chi-square Test 3DF</b> <b>P Value</b> <b>LS</b>		<b>17.402</b> <b>P&lt;0.001</b> <b>HS</b>	<b>4.506</b> <b>P=0.283</b> <b>NS</b>
Marital Status	Married	95	43	33
	Unmarried	5	1	2
	<b>Chi-square Test 1DF</b> <b>P Value</b> <b>LS</b>		<b>0.419</b> <b>P=0.518</b> <b>NS</b>	<b>0.058</b> <b>P=0.810</b> <b>NS</b>
Socio-Economic Status	<5000	59	32	22
	5000-10000	34	11	12
	10000-15000	3	0	1
	>15000	4	1	0
	<b>Chi-square Test 3DF</b> <b>P Value</b> <b>LS</b>		<b>7.324</b> <b>P=0.081</b> <b>NS</b>	<b>2.295</b> <b>P=0.701</b> <b>NS</b>

\*Multiple responses

Out of these 100 glaucoma cases, 95% were married in the present study. When association of marital status with identified psychiatric co-morbidity is concerned it was observed that the difference in proportion as per marital status was not found significant in any of three identified psychiatric co-morbidity i.e. anxiety and depression ( $P=0.518$  and  $P=0.810$  respectively). (Table 1)

In the present study maximum cases (more than half of total cases i.e. 59%) of glaucoma were found in less than 5000 income group. When association of psychiatric co-morbidity with income was observed in glaucoma cases, it was found that any of two identified psychiatric co-morbidity i.e. anxiety and depression was not associated ( $p>0.05$ ) with income. (Table 1)

Table No.2

## Association of Clinical Status with Anxiety and Depression in Glaucoma Cases (\*Multiple responses)

Clinical Status		Total Glaucoma Cases (N=100)	*Glaucoma Cases with	
			Anxiety (N=44)	Depression (N=35)
Pain	Yes	34	19	15
	No	66	25	20
	<b>Chi-square Test at 1 DF</b> <b>P Value</b> <b>LS</b>		<b>2.266</b> <b>P=0.132</b> <b>NS</b>	<b>1.324</b> <b>P=0.250</b> <b>NS</b>
Congestion	Yes	23	12	7
	No	77	32	28
	<b>Chi-square Test at 1 DF</b> <b>P Value</b> <b>LS</b>		<b>0.436</b> <b>P=0.509</b> <b>NS</b>	<b>0.750</b> <b>P=0.789</b> <b>NS</b>
Pupillary reaction	Yes	53	30	21
	No	47	14	14
	<b>Chi-square Test at 1 DF</b> <b>P Value</b> <b>LS</b>		<b>6.222</b> <b>P=0.013</b> <b>S</b>	<b>0.671</b> <b>P=0.413</b> <b>NS</b>
Anterior Chamber depth	Normal	72	31	26
	Shallow	28	13	9
	<b>Chi-square Test at 1 DF</b> <b>P Value</b> <b>LS</b>		<b>0.007</b> <b>P=0.936</b> <b>NS</b>	<b>0.020</b> <b>P=0.889</b> <b>LS=NS</b>
Visual Acuity ( Rt. Eye)	6/60 or less	37	23	15
	6/30 or more	63	21	20
	<b>Chi-square Test at 1 DF</b> <b>P Value</b> <b>LS</b>		<b>6.736</b> <b>P=0.009</b> <b>S</b>	<b>0.453 at 1 DF</b> <b>P=0.501</b> <b>LS=NS</b>
Visual Acuity ( Lt. Eye)	6/60 or less	28	18	9
	6/30 or more	72	26	26
	<b>Chi-square Test at 1 DF</b> <b>P Value</b> <b>LS</b>		<b>5.402</b> <b>P=0.020</b> <b>S</b>	<b>0.020 at 1 DF</b> <b>P=0.889</b> <b>LS=NS</b>

As far as the on clinical examination of glaucoma cases is concern in this study, pain was found in 66% of cases, congestion in 23%, pupillary reaction in 53%, anterior chamber depth shallow in 28%, visual acuity 6/60 or less in right eye in 37% and in left eye 28%. When association of psychiatric co-morbidity with findings on clinical examination of glaucoma cases was observed it was found that

although depression was not found to be associated with any of symptom ( $P>0.05$ ) but anxiety were found associated with many of symptoms. Anxiety was found significantly more in cases with positive pupillary reaction (56.6% v/s 29.7%,  $P=0.013$ ) and in visual acuity 6/60 or less in right eye (62.1% v/s 33.3%,  $P=0.009$ ) as well as in left eye (64.2% v/s 36.1%,  $P= 0.020$ ). (Table 2)

Among all glaucoma cases of present study, 75% were open angle and 25% were closed angle glaucoma. Likewise, maximum cases (54%) were of more than 24 months duration. Further, 34% cases were mild, 42% moderate and 24% severe cases of glaucoma. When association of psychiatric co-morbidity with severity of glaucoma cases was concerned it was found that although depression was not found to be associated ( $P>0.05$ ) but anxiety ( $P<0.001$ ) were found associated with severity of glaucoma. Anxiety was found that as the severity of glaucoma increases the proportion of insomnia and anxiety cases also increases. Identified psychiatric co-morbidities were not found to associate with type and duration of glaucoma. (Table 3)

Table No.3

Association of Glaucoma Variables with Anxiety and Depression in Glaucoma Cases (\*Multiple responses)

Glaucoma Variables		Total Glaucoma Cases (N=100)	*Glaucoma Cases with	
			Anxiety (N=44)	Depression (N=35)
Duration of Glaucoma	<6 Month	19	4	8
	6-9 Month	7	4	4
	9-12 Month	7	2	2
	12-24 Month	13	8	4
	>24 Month	54	26	17
	Chi-square Test at 1 DF		<b>7.272</b>	<b>2.454</b>
P Value	LS	<b>P=0.124</b> NS	<b>P=0.653</b> NS	
Type of Glaucoma	Open Angle	75	33	26
	Closed Angle	25	11	9
	Chi-square Test at 1 DF		<b>0.054</b>	<b>0.020</b>
	P Value	LS	<b>P=0.816</b> NS	<b>P=0.887</b> NS
Severity of Glaucoma	Mild	34	6	8
	Moderate	42	22	18
	Severe	24	16	9
	Chi-square Test at 1 DF		<b>15.784</b>	<b>3.172</b>
P Value	LS	<b>P&lt;0.001</b> HS	<b>P=0.205</b> NS	

#### 4. Discussion:

Regarding association with sex, it was also observed that difference in proportion as per sex was not found significant in any of two identified psychiatric co-morbidity i.e.anxiety and depression. Similar

observations were made by others also.<sup>9,10,11</sup> But in contrast to this *Dawodu et al*<sup>12</sup> found all the depressed patients were males.

In present study, maximum cases of glaucoma were found in age 50-70 years of age group. When association of psychiatric co-morbidity with age was observed in glaucoma cases, it was found that although depression was not found to be associated but insomnia and anxiety were found associated with age but anxiety was significantly more in 50-70 years of age group. Well comparable findings were of many of authors<sup>10,11,12</sup> But in contrast to this some report that Glaucoma can affect any age group, including newborn, infants, children and elderly<sup>4</sup>.

When association of psychiatric co-morbidity with clinical profile of glaucoma cases was observed it was found that although depression was not found to be associated with any of symptom ( $P > 0.05$ ) but anxiety was found associated with many of symptoms. Anxiety was found significantly more in cases with positive pupillary reaction and in visual acuity 6/60 or less in right eye as well as in left eye. Well comparable was reported by other authors.<sup>11,12</sup> In contrast to the present study observations, Uzma Fasih et al<sup>13</sup> observed significantly higher anxiety in open angle glaucoma. Quigley HA et al<sup>2</sup> also reported that visual field defects and subsequently marked loss of vision that give rise to psychological disorders.

When association of psychiatric co-morbidity with severity of glaucoma cases was concerned it was found that although depression was not found to be associated but anxiety was found associated with severity of glaucoma. For anxiety was found that as severity of glaucoma increases the proportion of anxiety cases also increases. Identified psychiatric co-morbidities were not found to associate with type and duration of glaucoma. A recent population-based study conducted by Wang et al.<sup>14</sup> reported that the association between depression ( $\text{PHQ-9} \geq 10$ ) and glaucoma reflected patient perceptions and subjective experiences of their illness rather than conventional objective measures of glaucoma severity.

## CONCLUSIONS

Anxiety and depression exist as co-morbidity with glaucoma. Anxiety is associated with age, pupillary reaction, visual acuity in both the eyes and severity of glaucoma in glaucoma cases, with age and severity of glaucoma it was observed highly significant. Depression is not associated with any of supra-said factors in glaucoma cases

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